CONTENTS

High Affinity Metal-Binding Proteins in Non-Mammalian Species

B. A. Fowler. Preface 3

D. P. Higham, P. J. Sadler, and M. D. Scawen. Cadmium-binding proteins in *Pseudomonas putida*: pseudothioneins 5

Y. Hayashi, C. W. Nakagawa, and A. Murasugi. Unique properties of Cd-binding peptides induced in fission yeast, *Schizosaccharomyces pombe* 13

M. Beltramini and K. Lerch. Primary structure and spectroscopic studies of Neurospora copper metallothionein 21

H-U. Meisch and J. A. Schmitt. Characterization studies on cadmium-mycophosphatin from the mushroom *Agaricus macrosporus* 29

M. Kaneta, H. Hikichi, S. Endo, and N. Sugiyama. Chemical form of cadmium (and other heavy metals) in rice and wheat plants 33

J. M. Frazier. Cadmium-binding proteins in the mussel, *Mytilus edulis* 39

G. Roesijadi. Mercury-binding proteins from the marine mussel, *Mytilus edulis* 45

Y. Dohi, K. Kosaka, K. Ohba, and Y. Yoneyama. Cadmium-binding proteins of three marine molluscs and characterization of two cadmium-binding glycoproteins from the hepatopancreas of a whelk, *Buccinum tenuissimum* 49

M. Nordberg, I. Nuottaniemi, M. G. Cherian, G. F. Nordberg, T. Kjellström, and J. S. Garvey. Characterization studies on the cadmium-binding proteins from two species of New Zealand oysters 57

B. A. Fowler, D. W. Engel, and M. Brouwer. Purification and characterization studies of cadmium-binding proteins from the American oyster, *Crassostrea virginica* 63

R. W. Olafson. Physiological and chemical characterizations of cyanobacterial metallothioneins 71

D. J. Gingrich, D. N. Weber, C. F. Shaw, J. S. Garvey, and D. H. Petering. Characterization of a highly negative and labile binding protein induced in *Euglena gracilis* by cadmium 77

D. W. Engel and M. Brouwer. Cadmium and copper metallothioneins in the American lobster, *Homarus americanus* 87

M. Brouwer, P. Whaling, and D. W. Engel. Copper-metallothioneins in the American lobster, *Homarus americanus*: potential role as Cu(I) donors to apohemocyanin 93

J. Overnell. Occurrence of cadmium in crabs (*Cancer pagurus*) and the isolation and properties of cadmium metallothionein 101

G. Maroni, D. Lastowski-Perry, E. Otto, and D. Watson. Effects of heavy metals on Drosophila larvae and a metallothionein cDNA 107

H. Kito, Y. Ose, and T. Sato. Cadmium-binding protein (metallothionein) in carp 117

F. L. Harrison and J. R. Lam. Copper-binding proteins in liver of bluegills exposed to increased soluble copper under field and laboratory conditions 125

J. Kay, D. G. Thomas, M. W. Brown, A. Cryer, D. Shurben, J. F. deL. G. Solbe, and J. S. Garvey. Cadmium accumulation and protein binding patterns in tissues of the rainbow trout, *Salmo gairdneri* 133

J. Price-Haughey, K. Bonham, and L. Gedamu. Heavy metal-induced gene expression in fish and fish cell lines 141

R. Andersen, J. Frazier, and P. C. Huang. Transition metal-binding proteins from three Chesapeake Bay fish species 149

D. P. Higham, J. K. Nicholson, J. Overnell, and P. J. Sadler. NMR studies on crab and plaice metallothioneins 157

P. Weis, J. D. Bogden, and E. C. Enslee. Hg- and Cu-induced hepatocellular changes in the mummichog, *Fundulus heteroclitus* 167

H. F.-K. O. Hennig. Metal-binding proteins as metal pollution indicators 175

H. C. Stone, S. B. Wilson, and J. Overnell. Cadmium-binding proteins in the scallop, *Pecten maximus* 189

M. Vašák. Dynamic metal-thiolate cluster structure of metallothioneins 193

B. A. Fowler and M. M. Megginson. Isolation and partial characterization of a high molecular weight Cd/Zn-binding protein from the kidney of the scallop, *Placopecten magellanicus*: preliminary studies ... 199

K. D. Jenkins and B. M. Sanders. Relationships between free cadmium ion activity in seawater, cadmium accumulation and subcellular distribution, and growth in polychaetes 205

D. R. Winge and M. Brouwer. Discussion summary. Techniques and problems in metal-binding protein chemistry and implications for proteins in nonmammalian organisms 211

M. Vašák and I. Armitage. Discussion summary. Nomenclature and possible evolutionary pathways of metallothionein and related proteins 215

D. H. Petering and B. A. Fowler. Discussion summary. Roles of metallothionein and related proteins in metal metabolism and toxicity: problems and perspectives 217

Conference on Phthalic Acid Esters

W. W. Kluwe. Preface 227

T. J. B. Gray and S. D. Gangolli. Aspects of the testicular toxicity of phthalate esters 229

P. Sjöberg, N. G. Lindqvist, and L. Plöen. Age-dependent response of the rat testes to di(2-ethylhexyl) phthalate 237

J. A. Thomas, D. B. Wienckowski, B. A. Gillies, M. J. Thomas, and E. J. Youkilis. Effects of phthalic acid esters (PAEs) on the neonate and aspects of teratogenic actions 243

I. Tomita, Y. Nakamura, Y. Yagi, and K. Tutikawa. Fetotoxic effects of mono-2-ethylhexyl phthalate (MEHP) in mice 249

G. R. Douglas, A. P. Hugenholtz, and D. H. Blakey. Genetic toxicology of phthalate esters: mutagenic and other genotoxic effects 255

B. J. Phillips, D. Anderson, and S. D. Gangolli. Studies on the genetic effects of phthalic acid esters on cells in culture 263

W. K. Lutz. Investigation of the potential for binding of di(2-ethylhexyl) phthalate (DEHP) to rat liver DNA *in vivo* 267

W. M. Kluwe. Carcinogenic potential of phthalic acid esters and related compounds: structure–activity relationships 271

J. M. Ward, B. A. Diwan, M. Ohshima, H. Hu, H. M. Schuller, and J. M. Rice. Tumor-initiating and promoting activities of di(2-ethylhexyl) phthalate *in vivo* and *in vitro* 279

P. W. Albro. Absorption, metabolism, and excretion of di(2-ethylhexyl) phthalate by rats and mice 293

C. Rhodes, T. C. Orton, I. S. Pratt, P. L. Batten, H. Bratt, S. J. Jackson, and C. R. Elcombe. Comparative pharmacokinetics and subacute toxicity of di(2-ethylhexyl) phthalate (DEHP) in rats and marmosets: extrapolation of effects in rodents to man 299

G. Rock, R. S. Labow, and M. Tocchi. Distribution of di(2-ethylhexyl) phthalate and products in blood and blood components 309

J. K. Reddy, M. K. Reddy, M. I. Usman, N. D. Lalwani, and M. S. Rao. Comparison of hepatic peroxisome proliferative effect and its implication for hepatocarcinogenicity of phthalate esters, di(2-ethylhexyl) phthalate, and di(2-ethylhexyl) adipate with a hypolipidemic drug 317

B. Astill, E. Barber, A. Lington, E. Moran, A. Mulholland, E. Robinson, and B. Scheider. Chemical industry voluntary test program for phthalate esters: health effects studies 329

E. F. Group, Jr. Environmental fate and aquatic toxicology studies on phthalate esters 337

Contributed Articles

D. K. Agarwal, S. Eustis, J. C. Lamb IV, J. R. Reel, and William M. Kluwe. Effects of di(2-ethylhexyl) phthalate on the gonadal pathophysiology, sperm morphology, and reproductive performance of male rats 343

A. V. Arundel, E. M. Sterling, J. H. Biggin, and T. D. Sterling. Indirect health effects of relative humidity in indoor environments 351

P. G. Ganrot. Metabolism and possible health effects of aluminum 363

Published Volumes of EHP 443

Instructions to Authors 445